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A new GPS derived data set of uplift rates in the Antarctic Peninsula

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The Antarctic Peninsula is a region of Antarctic for which GIA models remain relatively poorly constrained, with the spatial pattern of predicted uplift rates differing between major models. Observed uplift rates, such as those from GPS, are increasingly being used to distinguish between the models, offering a dataset that can be used to validate and / or constrain post Last Glacial Maximum (LGM) ice history and Earth rheology. In the Antarctic Peninsula, the configuration of the ice sheet around the Larsen B embayment is of particular interest, and is a focus of the LARsen Ice Shelf System (LARISSA) project

Uncertainty also remains over the scale of contemporary ice mass loss from the fast warming Antarctic Peninsula over the last decade. It is now known that disintegration of buffering ice shelves, including the Larsen B Ice Shelf, is causing glaciers to speed up, resulting in an increase in the rate of continental ice loss, and a consequential elastic rebound of the Earth's surface. Recent acceleration in crustal uplift rates has already been observed in GPS station coordinate time series for this region. Additionally, it has recently been suggested that there was also a loss of ice following the Little Ice Age (LIA). Here, we focus on an observed GPS dataset of uplift rates for the Antarctic Peninsula, and the challenge of separating out the elastic signal from the ongoing GIA correction.

We present the results from an up to date analysis of continuous and campaign GPS data from the Antarctic Peninsula and West Antarctica, including the new LARISSA network of 6 GPS stations. We consider in particular the elastic component of the uplift. The LARISSA network is unique in its spatial organization and ability to triangulate the location of recent ice mass loss. It is arranged in two triangular patterns with two coastal sites and one far field site on the west (Vernadsky, Duthier's Point and Hugo Island respectively) and one coastal and two far field sites on the east (Foyn Point and Robertson Island, Cape Framnes respectively).

Finally, we compare our observed GIA rates with those predicted by the GIA model of Ivins and James and the ICE-5G model.